F·A·A·M facility for airborne atmospheric measurements

FLIGHT FOLDER

Flight No.:	B250
Date:	30 November 2006
Take Off	10:21:35
Landing:	15:28:33
Flight Time	5h06m58

Campaign: NEON

Operating Area: East Anglia and North Sea

POB	Position	Name	Institute
1	Captain	Alan Foster	Directflight
2	Co-pilot	Steve Ball	FAAM
3	CCM	Dawn Quinn	Directflight
4	Mission Scientist	Clare Lee	Met Office
5	Flight Manager	Jim Crawford	FAAM
6	Core Chemistry / CCM2	Doug Anderson	FAAM
7	Cloud Physics	Paul James	FAAM
8	IR Camera	James Bowles	Met Office
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
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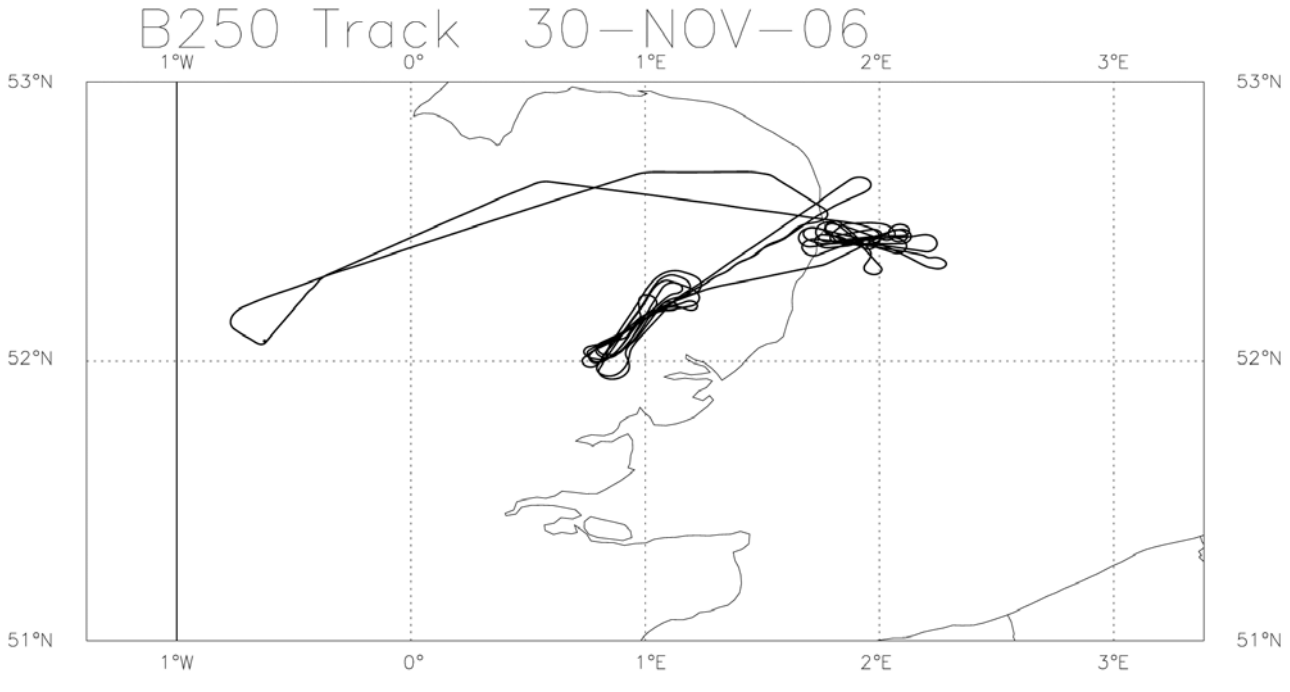
20			

Flight Track:

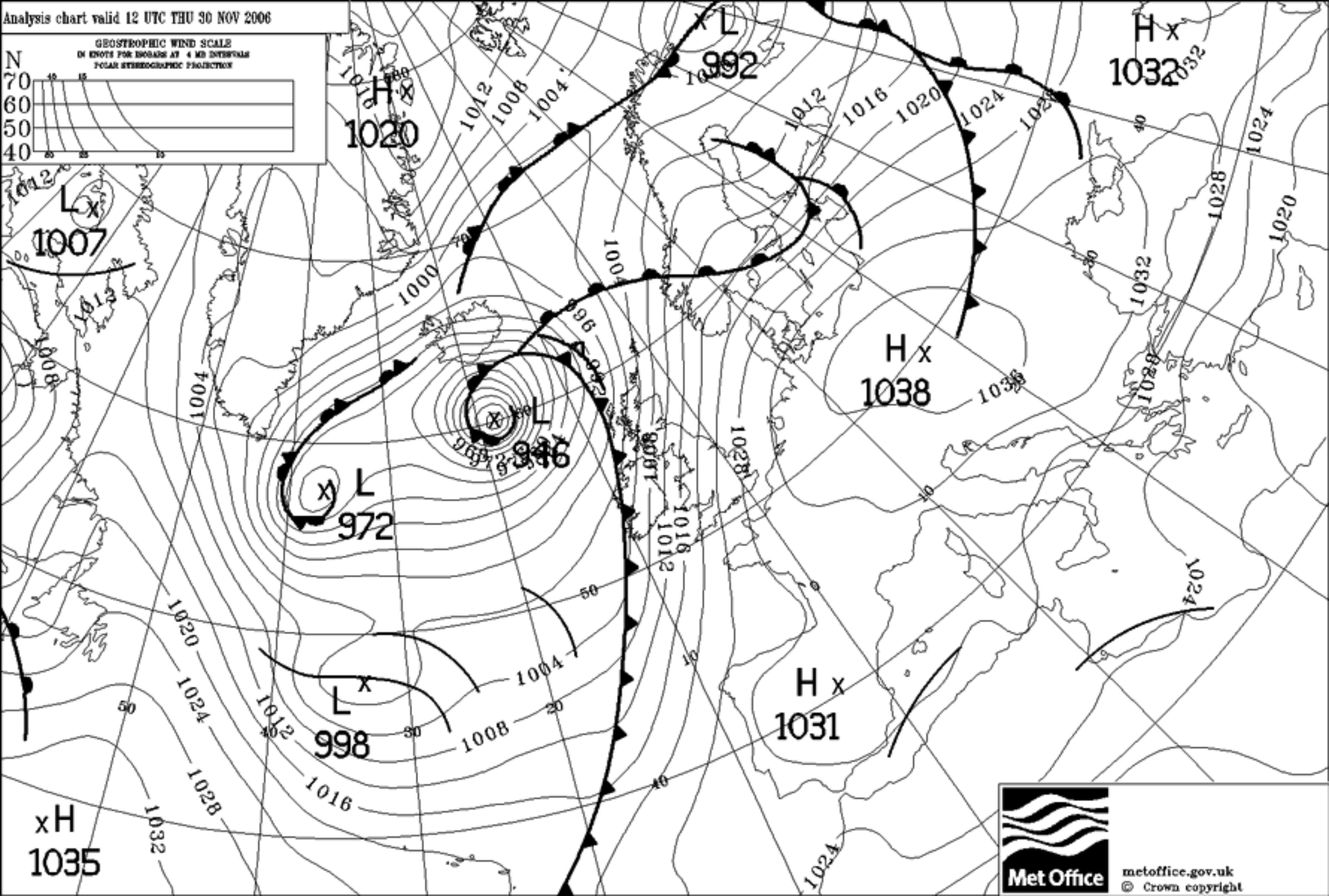


FLIGHT SUMMARY

Flight No b250
Date: 30 Nov 06
Project: NEON
Location: East Anglia / North Sea

Start Time	End Time	Event	Height (s)	Hdg	Comments
095827		inu	-.03 kft	128	to navigate
095955		!	-.03 kft	128	HORACE recording ok
100018		!	-.03 kft	128	DRS status ok
102135		T/O	-.04 kft	211	Cranfield
102419		Video	4.6 kft	029	#1 spotter #2 IR camera
103819		Radar	11.0 kft	071	recording
104226		Nev	11.0 kft	097	zero
104339		JW	11.0 kft	140	zero
104927	110458	Profile 1	10.1 - -.12 kft	219	
110141		!	1.8 kft	223	30K +10 +8 Wattisham report
110934		H	0.34 kft	088	cal 7
111226	111246	Run 1.1	0.32 - 0.36 kft	053	
111635		H	0.45 kft	289	cal 7
111905	111931	Run 1.2	0.34 - 0.39 kft	222	
112209		H	0.83 kft	202	cal 7
112537	112558	Run 2.1	0.85 kft	031	
113019	113047	Run 2.2	0.88 - 0.87 kft	204	
113304		H	2.9 kft	245	cal 7
113647	113716	Run 3.1	2.9 kft	024	
113730		H	2.9 kft	026	cal 6
114343	114410	Run 3.2	2.9 kft	215	
114725		H	4.9 kft	063	cal 6
114831		Video	4.9 kft	037	#3 spotter #4 IR
114903	114926	Run 4.1	4.9 kft	029	
115649	115725	Run 4.2	4.9 kft	205	
120207	120229	Run 4.3	4.9 kft	030	
121040	121108	Run 4.4	4.9 kft	205	
121532		H	10.0 kft	067	cal 6
121751	121815	Run 5.1	10.0 kft	031	
122630	122703	Run 5.2	10.0 kft	205	
123259	123331	Run 5.3	10.0 kft	035	
123454		H	10.0 kft	041	cal 6
124913	130458	Profile 2	10.0 - -.04 kft	224	
125304		!	6.6 kft	227	35 k +10 +07 1028 101
125737		!	3.8 kft	223	40k +10 +7 1027 1016 Wattisham
130522		H	0.28 kft	217	cal 7
130937		H	0.45 kft	066	cal 7
131205	131227	Run 6.1	0.46 - 0.51 kft	055	
131725	131751	Run 6.2	0.48 - 0.45 kft	222	
131909		H	0.98 kft	224	cal 7
131942		Video	0.94 kft	225	#5 spotter #6 IR
132401	132417	Run 7.1	0.94 - 0.95 kft	030	
133239	133315	Run 8.1	5.0 kft	060	
133915		H	2.8 kft	259	cal 7
134025	134054	Run 9.1	2.8 kft	251	
134527	134549	Run 9.2	2.8 kft	153	
135023	135100	Run 9.3	2.8 kft	316	
135453	135535	Run 9.4	2.8 - 2.9 kft	104	
135729	135744	Run 10.1	0.62 - 0.61 kft	245	
135807		H	0.62 kft	247	cal 7
140106	140121	Run 10.2	0.66 - 0.65 kft	124	
140500	140536	Run 10.3	0.65 - 0.64 kft	259	
140907		!	0.68 kft	098	
141525		Video	0.64 kft	255	#5 fwd #6 down
141601	141634	Run 10.4	0.64 - 0.69 kft	243	
141704		Video	0.65 kft	253	#5 spotter #6 IR
142042	142121	Run 10.5	0.60 - 0.65 kft	110	

142550	142620	Run 10.6	0.68 - 0.66 kft	250	
143140	143205	Run 10.7	0.63 - 0.61 kft	109	
143407		!	1.3 kft	110	cloud
143652		H	2.8 kft	275	cal 7
144011	144057	Run 11.1	2.8 kft	280	
144519	144546	Run 11.2	2.8 kft	101	
144818		Video	2.8 kft	321	#7 spotter #8 IR
145028	145132	Run 11.3	2.8 kft	248	
145634	145731	Run 11.4	2.8 kft	129	
152833		Land	0.06 kft	213	Cranfield


Analysis chart valid 12 UTC THU 30 NOV 2006
GEOSTROPHIC WIND SCALE
IN KNOTS FOR ISOBARS AT 4 MB INTERVALS
POLAR STEREOGRAPHIC PROJECTION
N
70
60
50
40
L 992
H 1032
H 1020
L 1007
H 1038
L 946
L 972
L 998
H 1031
H 1035
Met Office
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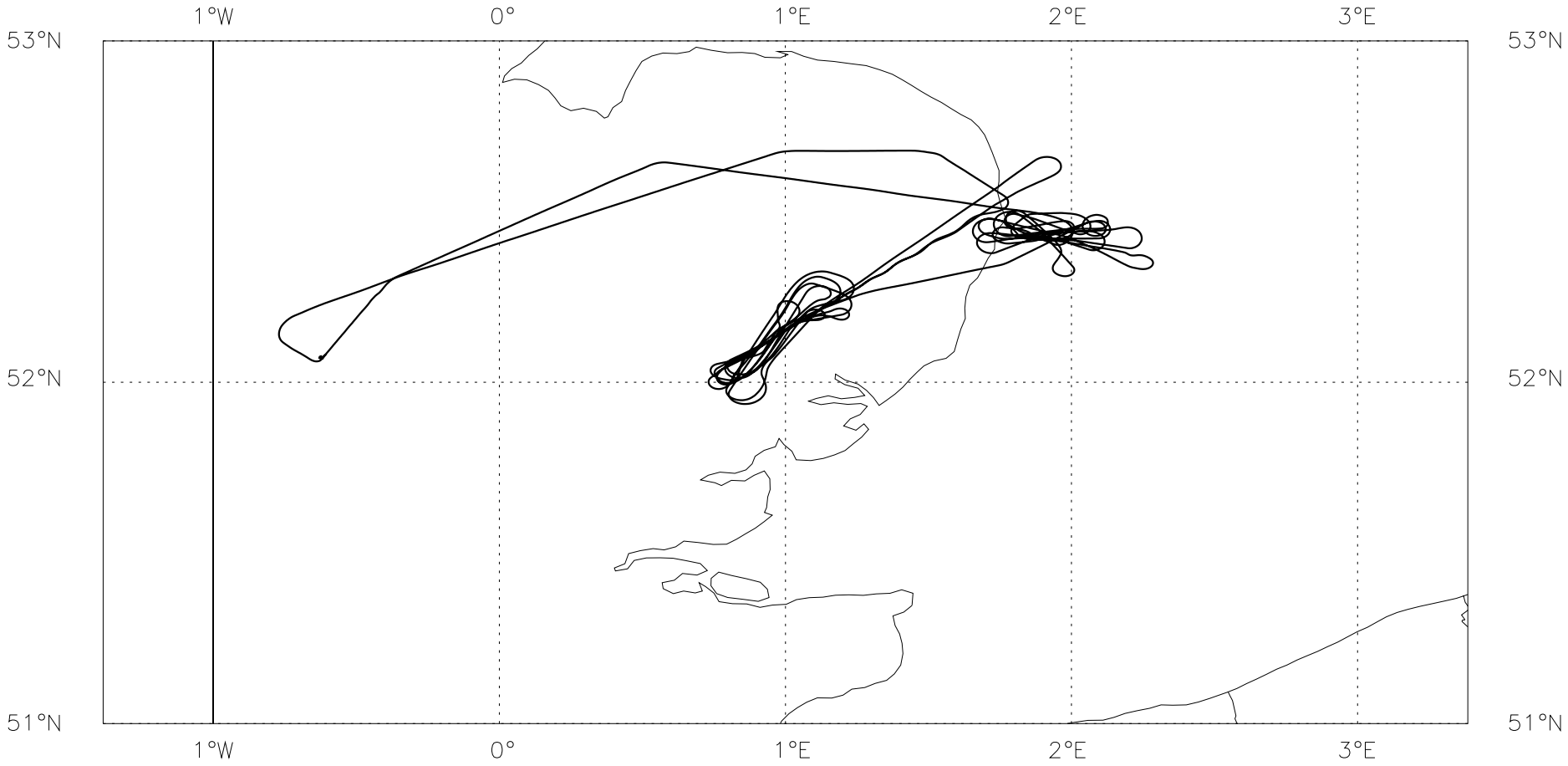
B250 Track 30-NOV-06



SORTIE BRIEF

Flight B250 (NEON flight during WINTEX) 30th. Nov 2006

Trial Objectives

To validate the NEON TDA using the IR camera looking at a runway.

- Almost identical to previous NEON sorties during VISURB and CAPEX, but without Heiman-ARIES-loops (as ARIES not available before Christmas)
- measurements under different (winter) atmospheric conditions intended

Take off

10:30 local

Location

Over and nearby a runway (Wattisham Airfield).

Weather

Ideally: Totally cloud free conditions, flights around lunch time.

Instrumentation Required

IR camera, core temperature, water vapour, Heimann, aerosol instruments (PCASP)

Special Conditions + Hints

- Note that in order to keep the runway in the field of view of the IR camera all altitudes will need to be flown at exact heights above the surface and not at flight levels.
- Try to get the same part of the runway in the FoV at every altitude.
- Try to keep a roughly constant role angle (ideally near zero) when taking photos of runway or ships.
- Important: Get information on ground-based visibility at the time of profiling from the airfield

Flight Pattern (see Fig. 1)

1. Take off and transit to airfield/runway, to arrive at 10,000ft.

--- Over/nearby runway----------

2. 1st PROFILE = descent at 1,000ft/min to minimum altitude (if possible with a missed approach at the operating airfield)
3. Two runs at 500ft, sequence: over and along runway, loop, displaced to runway over grass/ravel path next to runway; Heimann to look down on runway or grass respectively
4. 20-degree approaches (see Fig. 3), i.e. straight and level runs at 1000ft, 3000ft, 5000ft, and 10,000ft (getting the runway into the field of view of the IR camera)
5. 2nd PROFILE, identical to point 2 (if possible include another missed approach at the operating airfield)
6. repeat point 3

---

7. [Extra tasks, e.g. search a larger ship (e.g. a tanker) + fly at altitudes of 1000, 3000, 5000 and 10000ft above the ship, thereby getting the ship in the field of view of the IR camera

---

8. Transit back.
9. Landing.

Total time: about 3 hours for NEON + extras

NEON Sortie WINTEX

V/P = “fast” vertical profile
M/A = missed approach over runway
HAL = “Heimann-ARIES loop”

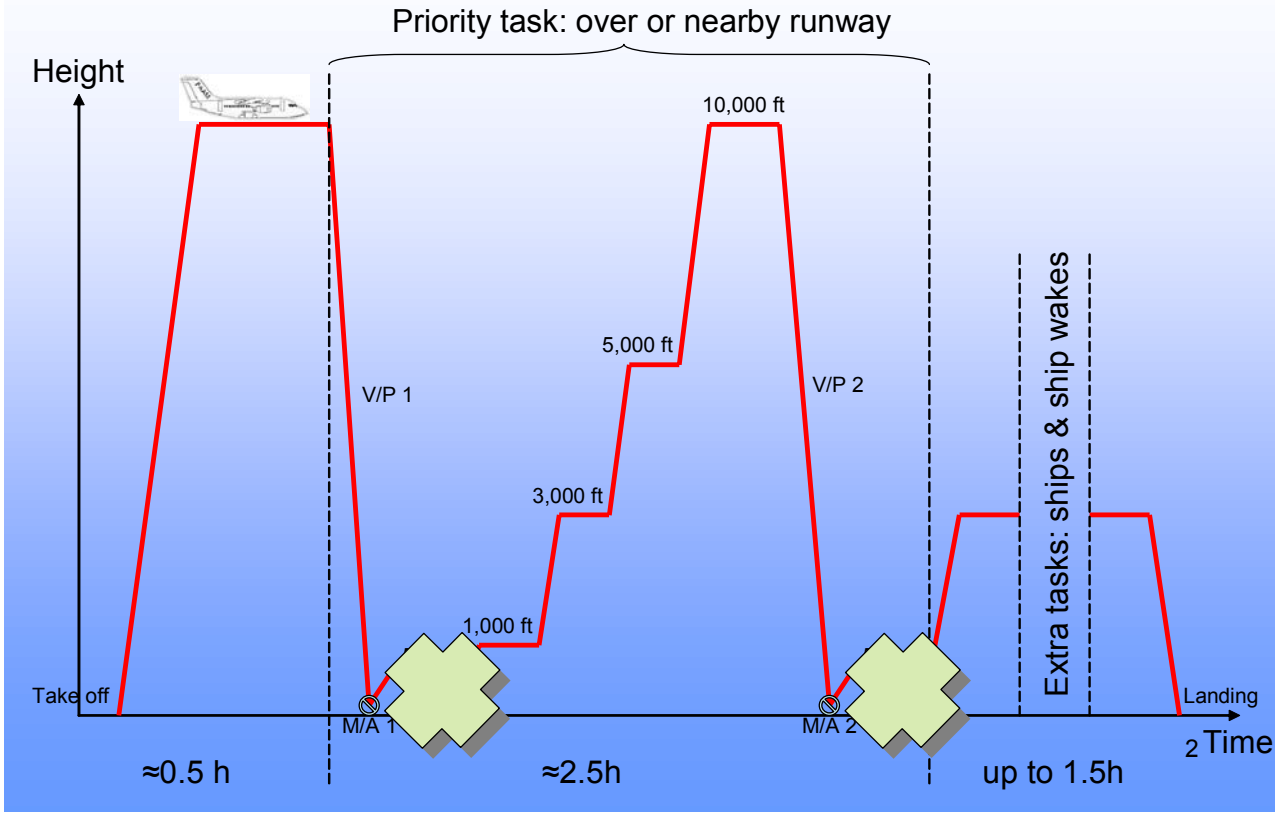


Fig. 1: NEON sortie Height vs. Time. It includes:

- Two vertical profiles (scientific flying), if possible ending with missed approaches
- Several “20-degree approaches” (cp. Fig. 3) at 1000, 3000, 5000, and 10,000ft.
- The two HALs (Heiman-ARIES-loops, as flown at earlier NEON missions) were crossed out and are substituted by points 3 and 6 in the flight pattern description.
- “Extra Tasks”: time can be used for whatever project to use the maximum flying time.

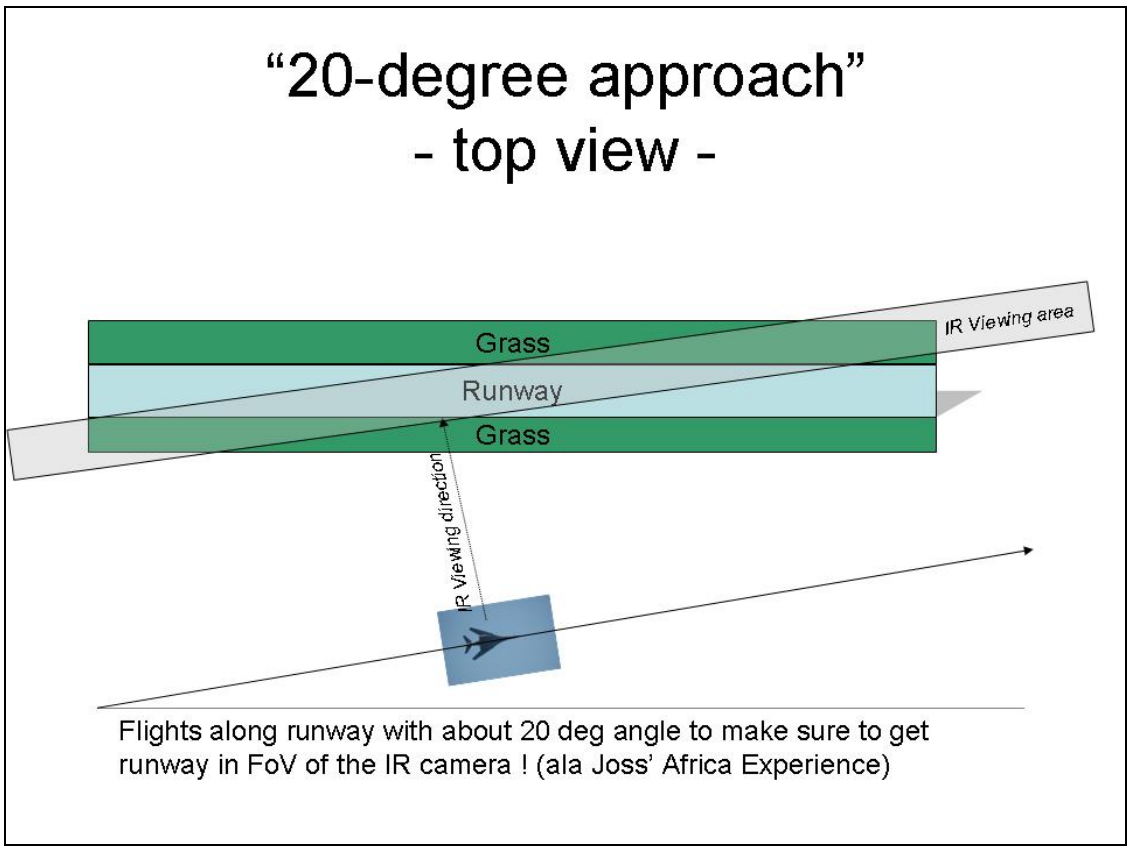


Fig. 3: "20 degree approach" instead of flying parallel to the runway to get runway in FoV of the IR cam.

!!!! IR camera

- Get runway in FoV of the IR camera during the 20-degree approaches (cp. Fig. 3), check using spotter camera. **If this fails, run must be repeated!**
- Record both, IR camera and spotter camera pics.

Appendix A: Height – Distance Conversion

The horizontal shift S of flight legs parallel to the runway to keep the runway in the view of the IR camera is dependent on the angle Y the camera is looking below the horizontal and the flight height H:

S (nautical miles) = H (ft) / tan(Y) * 0.3048 * 0.54E-03

Assuming IR camera view = 35 degrees down the horizontal:

(Use EXCEL sheet to compute distances for other angles, http://metresearch.net/CAESAR/)

Ideal NEON flight levels marked with an X	Flight Height (ft)	Displacement right of runway (nautical miles)	Flight Height (km)	Displace-ment (km)	Displace-ment (statute miles)	IR camera viewing distance (km)
missed approach: X	0	0	0	0	0	0
X	500	0.118	0.152	0.218	0.135	0.12
X	1000	0.235	0.305	0.435	0.270	0.53
	2000	0.470	0.610	0.871	0.541	
X	3000	0.705	0.914	1.306	0.811	1.59
	4000	0.940	1.219	1.741	1.082	
X	5000	1.175	1.524	2.176	1.352	2.66
	6000	1.410	1.829	2.612	1.623	
	7000	1.645	2.134	3.047	1.893	
	8000	1.880	2.438	3.482	2.164	4.25
	9000	2.115	2.743	3.918	2.434	
X	10000	2.350	3.048	4.353	2.705	5.31
	12000	2.821	3.658	5.224	3.246	
(X)	14000	3.291	4.267	6.094	3.787	7.44
	27000	6.346	8.230	11.753	7.303	

Table 1: Displacement for straight and level runs to keep the runway in the FoV of the IR camera (Y=35 degrees).

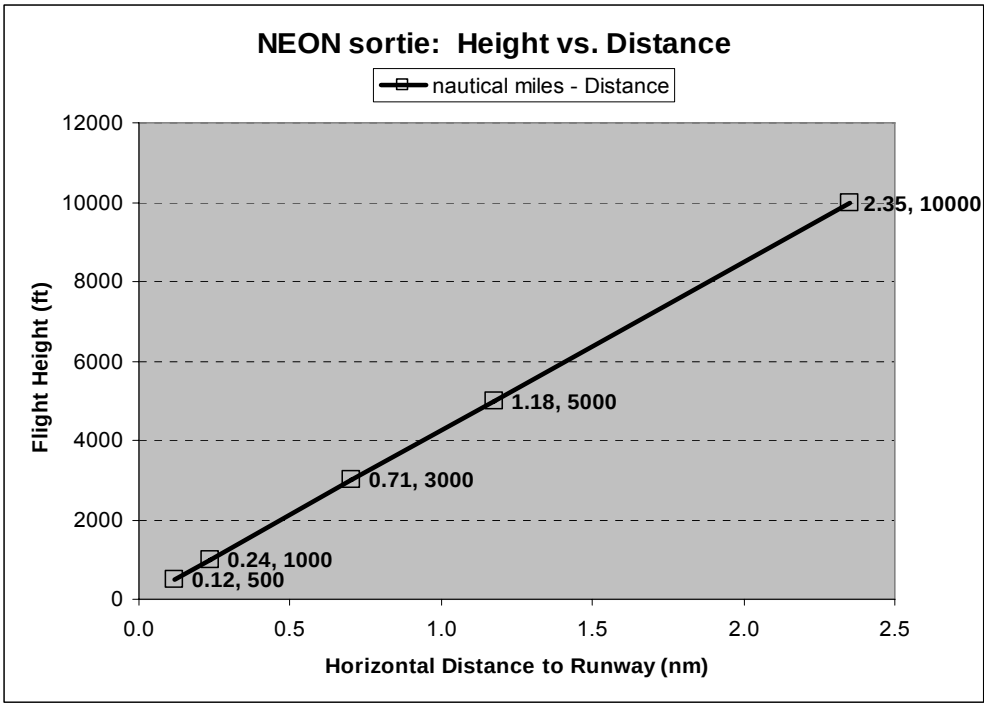


Fig. 4: Displacement graph (Y=35 degrees).

Mission scientist de-brief

B250 NEON flight
30th November 2006

Mission scientist: Clare Lee

This NEON flight was successful in the runway measurements, however the ship chasing proved extremely difficult with the narrow field of view lens on the IR camera.

Weather conditions:
7/8 to 8/8/ thin cirrus cloud with no cloud below throughout the whole flight in the operating area. There was a very gradual thickening of the cirrus throughout the flight, however for the period of the runway science the changes were not large. The wind was S/SW'ly.
Visibility, temperature and dew point readings were taken from Wattisham air traffic controller several times during the flight.

Sortie:
A profile descent from 10,000ft was made ending with a missed approach at 50ft over Wattisham runway. The profile was made without interruption for turns and hence started some distance from the airfield. Due to the meteorological conditions, the air mass in the whole operating area should be very representative of that directly over Wattisham.
Runs at 500ft were made over the runway and then over the grass to the right hand side of the runway for the Heimann to measure the surface temperature. The IR camera was also operated during these runs. Runs were then made at 1000ft, 3000ft, 5000ft and 10000ft displaced from the runway, such that the IR camera could measure the grass and runway with a 20 degree approach. Two good measurements at each level were ensured by repeating runs when appropriate. Heimann and core chemistry calibrations were made at each run level. Some air traffic problems were encountered when requesting to go from 5000ft to 10,000ft, so the opportunity to do an additional run was made, whilst waiting for clearance.
A profile descent from 10,000ft was then made in the same manner as the first one. A second set of 500ft runs first over the runway and then over the grass was made. A further 1000ft 20degreee approach run was made to ensure a full data set.
The aircraft ascended to 5000ft for transit to the sea for ship measurements. A large anchored ship was identified as a suitable target. With the narrow field of view of the IR camera this proved difficult, particularly with the additional requirement of being straight and level so that the measurement angle would be 30 degrees. It became apparent that the "stationary" target was drifting with the currents and hence unpredictable in its position. As other ships passed through the area opportunities were taken to measure these instead. During this exercise the IR camera managed to capture one good image and 2 partial images of ships. A full set of measurements at different altitudes was not possible and hence the task was aborted. Towards the end of the flight over the sea, small Cu clouds started to penetrate the operating area from the East and would have interfered with measurements if the flight had continued.
During one of the ascents during the ship task the aircraft passed through several of the Cu puffs to test the FFSSP.

Instrument problems:

TWC – gave no data
2DC – generating masses of data and filling up the disk drive, hence switched off during the flight.
Mission scientist laptop – problems with the mouse and lack of connection to Horace
– flight manager laptop used by the mission scientist instead.

Aircraft Scientist's Log

Flight No B250 Date 30/11/06 Name CLARE LEE Page 1 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
102135					T/O Cranfield.
					8/8 thin Mid + High cloud.
1035		11000ft.	097		Transit - In distance patch Ci ~4/8
					Patches of very small Cu around
					in dumps
114927	Pl1	10000ft.	219	52°26'N 1°36'E	Profile → 500ft at Wattisham
					During descent small puffs Cu to N+W
					Gear down during descent.
105039					Wattisham Vis: 22km 700 broken 22kft.
					8/8 Ci above T=+10, +9=+9 Dew. 9°C
1058		4000ft.	225		7/8 Ci Above.
					wind 18ms⁻¹ /195°
110120					Vis: 30km T=+10/+8 (Wattisham)
					1019 QFE Wattisham
110458	Pl end	50ft.	227	52°5.4N 1°0E	End profile.
					wind: 7/197
					T/T_D = 9 / 7 °C.
110530					Gear up.
110931		500ft.			Core chem + Heiman cal.
					in left hand turn.
					T/T_D = 8.34 / 6.41
					wind: 14ms⁻¹ /186°
					7/8 Ci overhead v. thin.
111124	R 1-4	500ft.	052		Over runway
111245	R 1 on	500ft.			End runway
1113		1000ft.			Going up to 1000ft to turn around.

Aircraft Scientist's Log

Flight No **B**.250 Date 30/11/06 Name CLARE LEE Page 2 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					7/8 Ci overhead otherwise clear
111710		500ft.	244	52°5.9'N 1°0'E	Heading back towards runway.
111905	R1.2.	500ft.	244		Over grass beside runway.
					CIR camera should see grass
					on other side, pan + aircraft shelter)
111931	R1.2end.	500ft.			Run end then climb out.
112537	R2.1s	1000ft.	031		Run displaced from runway 20° Approach.
112558	R2.1E	1000ft.			End run
					wind: 18/171°, T/TD 7.3/4.9
113019	R2.2s	1000ft.	203		Run displaced from runway (20° approach)
113047	R2.2E	1000ft.	202		End run.
					climb to 3000ft. Heimann + chem cals
113647	R3.1s	3000ft.	024	52°5.9'N 0°53.9E	Run displaced from runway (20° Approach)
					T/TD = 8.06/-29.9°
					wind: 18ms⁻¹/189°
					7/8 Ci above, no other clouds.
113716	R3.1E	3000ft	026		End run.
114343	R3.2s	3000ft.	215		Run displaced from runway. (10° Approach)
					1018 QtH.
114410	R3.2E	3000ft.			End run
					climb to 5000ft.
144720		5000ft.			Heimann + core chem cals started.
114903	R4.1s	5000ft.	030	52°5.9'N 0°53.9E	Run displaced. 20° Approach.
114926	R4.1E	5000ft.	027		IR camera missed runway.
					T/TD = 5.44°/-15.75°
		5000ft.			Wind = 15ms⁻¹/187°

Aircraft Scientist's Log

Flight No B250 Date 30/11/06 Name CLARE LEE Page 3 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
115649	R4.2S	5000ft.	205		2nd attempt. - adjusted distance
					away.
					$T/T_D = 5.72 / -15.92°C$
					wind = 14ms^{-1} / 187°
115725	R4.2E	5000ft.	205		End run. - reasonably good pos.^{n}
					(same end of runway shown on IR camera)
120207	R4.3S	5000ft.	030		Start run. - adjusted from
					~~#~~ R4
120229	R4.3E	5000ft	029		Run end.
					Probs. with air traffic Lance
					staying at 5000ft + may as
					well do another pass of airfield.
121040	R.4.4S	5000ft.	206		Start run displaced from runway.
121108	R4.4E	5000ft.	202		End run.
					Can only climb to 8000ft.
					now allowed to go to 10000ft.
121528		~~10000ft~~ FL100			Heimann + dew cal.
121751	R5.1S	FL(100)	030		Run displaced. sure good though.
121815	R5.1E	FL100)			not quite right for IR pos.^{n}.
		10000ft on HHG			$T/T_D = -2.07 / -39.0°$
					Winds 20ms^{-1} / 201°
					Still clear below with 7/8 cloud above.
122630	R5.2S	10000ft.	205		(1.8 miles to right Run displaced)
122703	R5.2E	10000ft.			End run — good in IR camera.
123259	R5.3S	10000ft.	035		Run with adjusted displacement.
123331	R5.3E	10000ft.			towards end of runway in IR camera.

James happy enough good data.

Aircraft Scientist's Log

Flight No B250 Date 30/11/06 Name CLAIRE LEE Page 4 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					Heading out to get profile descent.
1244					V. thin Ci over sea. ~ 5/8
					some white caps. no Ci.
124913	P2 SL	10000ft.	237	~~50 FOG 10 SE~~	Profile descent.
				52°24'N/ 10°36'E	Lathkham:
					{Vis: 35km, broken 22kft.
					T/T$_D$ +10/+7}
					Gears down during descent
				descent speed.	200knts at FL100
					slowed to 121$^{knts}_{kn}$ at 8000ft.
125640		4000ft.	225		Vis: 40km, broken ~~22~~ kft.
					T/T$_D$ = 10°/7°, P = 1016mb
130458	P2 end	500ft.	218		Missed approach over Lathkham
					climbing to 1000ft., gear up.
130850					Turning to left + descending to 500ft
130410		500ft.			Cals (Heiman + core dem)
					Wind 13ms^{-1}/163°
					turbulence at low levels.
					T/T$_D$ 8.17°/5.7°
131205	R6 1 S	500ft.	053		Over runway
131227	R6 1 E	500ft.	055		End runway
					Climbing to 1000ft to turnaround.
131725	R6 2 S	500ft.	223		Over grass to right of runway to right.
131751	R6 2 E	500ft.	222		End run
					climb to 1000ft.
					Want to redo 1000ft to be sure have data.

Aircraft Scientist's Log

Flight No **B**250 Date 30/11/06 Name CLARKE LEE Page 5 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
132040		1000ft.			Heiman + chem cals.
					Land: 14ms⁻¹ / 168°
					T/Td 6.99/3.79°C
132401	R7.1	1000ft.	~~[illegible]~~ ←031		displaced approach at 20°
132417	R7.1E	1000ft.	←030		End run. Good IR images.
					Haze layer at 1000ft. (always there)
					7/8 Ci above no other clouds.
					Ascending for transit to over sea.
132810		5000ft.	081		Chem cal.
133148					Ship spotted.
133239	R8.1s	4970ft.	061		Testing at this height
133315	R8.1E	5000ft.			IR camera seeing part.
					Some Cu to E, thin Ci above. (v. small puffs)
134025	R9.1s	3000ft.	252		Passing ship 1'r to it's direction.
134054	R9.1E	3000ft.			Missed seeing it.
134527	[illegible] 9.2s	3000ft.	146		Passing same ship.
134549	[illegible] 9.2E	3000ft.			Ship heading 220 or 230°
~~[illegible]~~					- Too close. - caught only in spotter.
135023	9.3s	3000ft.			2 ships only 2nd smaller
135100	9.3E	3000ft.			one on IR camera. Going back for larger v. slow moving one.
					Heading 150° probably moored + just drifting.
135451	9.4s	3000ft.	103		Ship too close.
					- difficult to get good dist. as drifting unpredictably.

Aircraft Scientist's Log

Flight No **B**250 Date 30/11/06 Name CLARE LEE Page 6 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					Descending to 1000ft for
					smaller ship.
135729	R10.1S	1000ft.	245		Going past.
135535	R10.1E	1000ft.			Missed - too far away?
					Not on spotter camera
					White caps on sea.
140106	R10.2S	1000ft.	123		Still missed
140121	R10.2E	1000ft.			-not on spotter.
140500	R10.3S	1000ft.			Still going for same ship.
140536	R10.3E	1000ft.			
	R10.4S	1000ft.			Trying for larger original one.
140907	R10.4E	1000ft.			Missed again!
141601	R10.5S	1000ft.			large original anchored ship - going
					directly over the top.
					(will then step away to try
					+ pick it up.)
141618					On top.
141634	R10.4E	1000ft.			Even with displacement calculated
142042	R10.5S	1000ft.			by nav box ended up on top -
142121	R10.5E	1000ft.			ship definitely drifting.
142550	R10.6S	1000ft.	241		Still missed it!
142620	R10.6E	1000ft.			
143140	R10.7S	1000ft.	108		Trying again.
143205	R10.7E	1000ft.			Missed again!
					Climbing to 3000ft.
1434		1800ft.			Passing through clouds for
					FFSP.

Aircraft Scientist's Log

Flight No B250... Date 30/11/06... Name CLARE LEE..... Page 7 of 7

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
143623		3000ft.			Chris Heiman calls.
144011	R11.1S	3000ft.			Still same ship.
144057	R11.1E	3000ft.	279		Slightly too far away. in spotter.
144519	R11.2S	3000ft.	101		Trying same ship.
144546	R11.2E	3000ft.			still missed.
					G still at East end of track,
					but clear over ship area
					G 7/8.
145028	R11.3S	3000ft.			Same ship in spotter
145132	R11.3E	3000ft.			just at of IR camera view.
					N.B. G starting to come towards
					coast - beardline in interfering.
	R11.4S	3000ft.			last try.
	R11.4E	3000ft.			Still not right. Giving up.
					Transiting back to Cranfield.
~15:30					Landing
					Problems:
					2DC - generating masses of data
					- switched off.
					laptop - network connection.
					- mouse gittering again.
					TWC - gave no data.
Suggestion on getting specific info on ship size + location.					
-> planning in advance e.g. oil companies.					

HMS illustrious, in Southampton.
Or cross channel ferries? (But can't get 10kft in channel).
Harbour masters at Hull, Felixstow, Middlesborough.

Query: Probs

Problem with 2DC? - why need switched off?

MIS laptop internet connection
mouse

CLOUD PHYSICS LOG Flight B250

Date: 30/11/06	Operator: papj	DRS Time: 07:35:00	DAU1 Time: +0	DAU2 Time: +0	DAU3 Time: +0	Aux1 Time: +0	Aux2 Time: +0	Page 1 of 1

SG.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
fitted	yes		yes	yes	no	yes		yes		no			yes				2dc not operated because it's creating
																	Large data files
	20	0.08	4														Start p1
	25	0.08	8														090
105227	20	0.07	8														080
105334	25	0.08	8														070
105454	30	0.08	8														060
105540	50	0.08	8														050
105758	30	0.09	8														040
105920	100	0.09	8														030
110105	80	0.08	8														020
110300	200	0.08	8	10													010
110350	500	0.08	8	10													500ft
																	End p1
111226	450	0.08	9	10													Start and end 1.1
111905	400	0.08	11	10													Star and end 1.2
113019	400	0.08	12	10													Start and end run 2.2
113647	60	0.08	12														Start and end 3.1
114343	60	008	12														Start end 3.2
115649	20	0.08	15														Start end run 4.2
120207	20	0.08	16														Start end 4.3
																	Pruge the FFSSP and it increments
																	Block transfer by 1
121040	20	0.08	22														Start end run 4.4.
121751	25	0.08	23														5.1
122630	20	0.08	25														5.2
123259	20	0.08	26														5.3
124913																	P2
125030	40	0.08	28														080
125348	25	0.08	29														060
125710	70	0.08	29														040
130045	25	0.09	30														020
130305	500	0.08	31	10													010
																	End p2
131205	650	0.08	32	10													6.1
131722	550	0.08	34	10													6.2
132401	680	0.08	35	20													7.1
																	7.2
134025	5	0.11	37														9.1
134527	5	0.08	39														9.2
135023	5	0.08	40														9.3
135453	5	0.08	40														9.4
135729	430	0.08	41	10													10.1
140106	400	0.08	41	10													10.2

CLOUD PHYSICS LOG Flight B250

Date: 30/11/06	Operator: papj	DRS Time: 07:35:00	DAU1 Time: +0	DAU2 Time: +0	DAU3 Time: +0	Aux1 Time: +0	Aux2 Time: +0	Page 2 of 2

G.M.T	PCASP		FFSSP	SID1	SID2	2D2-C		2D2-P		CIP25			CIP100			Habit	Remarks
	Conc/cc	Mean R	Block TX	Count	Count	Conc/L	Max size	Conc/m3	Max size	Conc m3	Max size	LWC	Conc m3	Max size	LWC		
141601	325	0.08	45	10													10.4
142042	350	0.08	46	10													10.5
142550	400	0.08	47	10													10.6
143140	440	0.08	48	10													10.7
1435																	In and out of cloud for a small amount
																	Of time.
144011	7	0.09	103														11.1
144519	7	0.09	104														11.2
145028	5	0.09	105														11.3
145634	5	0.09	107														11.4

PCASP Flowrate = 1.8 CC/Sec
PCASP noisy at times at height probably due to heater fail
FFSSP off for most of the flight due to overheat
SID2 off for most of the flight due to excessive noise
Some 2DC images of dust
Word crashed so some loss of log

Revision date: 11/12/2006 5:31 PM

CLOUD PHYSICS PROCESSING LOG

Flight number: **B250** **T/O:** 102135
Date of flight: 30/11/06 **Land:** 152833

A) FFSSP PROCESSING		
Processing Stage	Done?	Comments
1) Transfer *.txt files from DVD to processing PC		
Bnnn_FFSSP_hh.txt for each hour of data Bnnn_FFSSP_HVMS.txt		**hh =** **Last sec processed =**
2) FTP the files (ascii) from the PC to directory PMSDATA: on FLOODS		**File size =**
3) FLOODS> **RUN MRFB:[PMS.FAST_FSSP]FSSP_EXTRACT_TAS** a) Flight number: **Bnnn** b) Path name: **MFDDATA:Bnnn_MFDX** c) Output directory: **PMSDATA:** d) Start time: *0 if unknown (see comment box)* e) End time: *240000 if unknown*		Use time just before/after take-off/landing. If T/O /landing just after/before the hour, ensure start/end time is before/after the hour if there is an FFSSP_hh.txt file for that hour.
4) FLOODS> **RUN MRFB:[PMS.FAST_FSSP]FFSSP_PROCESS_TXT** a) Flight number: **Bnnn** b) Directory: **PMSDATA:** c) TAS in processing: **Y** d) Vel threshold (clicks) **0** e) Calibration file: *Use the most recent calibration file.* Format FFSSP_CALddmmyyyy.txt Calibration files to be stored in MRFB:[PMS.FAST_FSSP] f) Adjust FFSSP time **Y/N** g) If Y, enter value to add to data time (seconds)		**Total glitches =** **Sec file written ok?** **Note calibration file used** Yes only if gross errors occur in FFSSP time eg; ~ 1hour
5) FLOODS> **WAVE** a) WAVE> **write_procffssp_to_m5,'pmsdata:Bnnn_procffssp.dat', 'mfddata:Bnnn_mfdX','pmsdata:Bnnn_m5procffssp',/auto** b) WAVE> **exit**		Use PVWAVE for this section **Note time correction applied to FFSSP by /auto =**
6) FLOODS> **MODIFY** a) Modifying datasets: **pmsdata:Bnnn_m5procffssp** b) Dataset: **mfddata:Bnnn_mfdX** c) New dataset: **mfddata:Bnnn_mfdY (y=x+1)** d) Parameter description file: *leave blank to use default*		**Input file size =** **M5 output file size =**
7) CHECKS: i). Are FFSSP and JW/Nevzorov LWC synchronized in time? *In flight_plot, parameters* *JW LWC para 535* *Nevzorov LWC para 602* *FFSSP LWC para 1202* ii). If not, repeat from step 5b replacing /auto with **addt=x** which adds x+20 secs to FFSSP time.		**Synchronized?**

CLOUD PHYSICS PROCESSING LOG

Flight number: **B250**
Date of Flight: 30/11/06

B) 2D PROCESSING		REPROCESS +1hr
Processing Stage	Done?	Comments
1) Transfer B250.dat file from CD/DVD to PC	Y	
2) Zip up file on PC (B250.zip)	Y	
3) FTP the zipped file (binary) from the PC to the directory SEADAS_DATA:[SEADAS_DATA] on FLOODS	Y Y	
4) Log on to FLOODS	y	
5) Unzip SEADAS_DATA:[SEADAS_DATA]B250.zip	y	**Size of B250.dat =117486**
6) FLOODS> **WAVE**	Y	Use PVWAVE for this section
WAVE> **CONVERT_SEADAS_FILE**	Y	**Blocks read =34227**
a) Input file: **SEADAS_DATA:[SEADAS_DATA]B250.dat**	Y	**Blocks written = 34227**
b) Output file: **SEADAS_DATA:[SEADAS_DATA]B250_seadas.dat**	Y	**Bad reads =0**
WAVE> **exit**	y	
7) FLOODS> **RUN MRFB:[PMS.SEADAS]READM200_FILE**	Y	
a) Default directory: **PMSDATA:**	Y	
b) Flight number: **B250**	Y	
c) Disk file name: **SEADAS_DATA:[SEADAS_DATA]B250_seadas.dat**	Y	
d) Comment string:	Y	
e) Start time: *0 if unknown (T/O – 5 min)*	**Y**	**Start = 0**
f) End time: *240000 if unknown (Land + 5 min)*	**Y**	**End = 240000**
g) Read 2DC: **Y**	N	Ignore error message scroll
h) Read 2DP: **Y**	Y	(vestigial error from tapes)
i) Secondary data: **Y**	Y	
j) FSP-SYNC: **Y**	Y	**Are FRW, FSP, IMB, PCA,SEC**
k) cmd.str: **Y**	Y	**files in PMSDATA? yes**
l) Auto time correction: **N**	N	**Are they non-zero in size - y**
m) Full length secondary:**N**	n	B250_aux.dat
8) FLOODS> **WAVE**		2D image display and printing
i). WAVE> **imagedisplay**		Must be done from FLOODS
a) 2D directory name: **PMSDATA:**	No	itself.
b) Flight number: **Bnnn**	images	
c) File generation no: **0**		
d) Time from IWC plot: **N**		
e) Select probe: (**1**) 2DC (**2**) 2DP		
f) Start time: *As in 7e above*		
g) End time: *As in 7f above*		**Note any problems with images**
h) Time interval (sec): **5** recommended (0 for all images)		
ii). WAVE> **auto_image**		Prepare imagery for Core data
a) 2D directory name: **PMSDATA:**		From own PC again
b) Flight number: **Bnnn**		
c) Enter date: **YYYYMMDD**		
d) Enter start time: *0 if unknown (T/O – 1 min)*		**Start =**
e) Enter end time: *240000 if unknown (Land – 1 min)*		**End =**
f) Enter time interval (sec) between successive imaged blocks: **10**		
iii). WAVE> **exit** to create files		FAAM_YYYYMMDD_R0_
iv). FTP ascii *.PS files from PMSDATA: to PC		Bnnn_2Dx-images.ps
v). Load each into Ghostview or other pdf-converter		Notes on this in instructions
vi). Output as pdf file (720 dpi resolution), appending name prefix of **CORE-CLOUD-PHY**_ to converted files		**No images**

9) FLOODS> **RUN MRFB:[PMS.SPEC2D.AUTO]PROCESS2D_AUTO**		NB. an error message may
a) Flight number: **Bnnn**	Y	appear, floating point
b) Directory: **PMSDATA:**	Y	exception, rerun and use
c) File generation: *Hit enter*	Y	time quoted in error
d) Time correction: *Time offset of the 2D data*	Y	message, repeat until
e) TAS: **Y**	Y	successful.
f) MFD directory: **MFDDATA:B250_MFDX**	**Y**	**X =a**
g) Probe number: (**1**) 2DC (**2**) 2DP (**0**) Both	**Y**	
0 unless either probe known to be faulty	**Y**	
h) Start time: *0 if unknown (T/O + 30sec)*	**Y**	**Start =0**
i) End time: *240000 if unknown (Land – 30sec)*	**Y**	**End =** 240000
j) Nominal averaging: **0.2** seconds for conversion to M5	**Y**	
k) Particle type 2DC: **8** if known to be in ice cloud	**Y**	**Time data processed to =**
11 if known to be in water cloud	**Y**	
l) Particle type 2DP: **8** if known to be in mixed-phase	**Y**	**2dproc files present?**
8 if unknown	**Y**	*.2dc, *.2dp and *.dat
m) Coefficient choice: **2**	**Y**	
n) Output root filename: **PMSDATA:Bnnn_PROC2D**	**Y**	**No data blocks found**
10) FLOODS> **WAVE**		Use PVWAVE for this section
i) WAVE> **WRITE_PROC2D_TO_M5, 'PMSDATA:BNNN_PROC2D.DAT', 'PMSDATA:BNNN_M5PROC2D'**		Error message about HDDR file should be ignored.
ii). **exit**		**Records =**
11) FLOODS> **MODIFY**		
a) Modifying datasets: **pmsdata:Bnnn_m5proc2D**		
b) Datset: **mfddata:Bnnn_mfdX**		**X =**
c) New dataset: **mfddata:Bnnn_mfdY**		**Y = (X+1)**
d) Parameter description file: leave blank to use default		
12) CHECKS:		
Are 2DC/2DP IWC of comparable magnitude and well-correlated with Nevzorov TWC?		**Correlated?**
In flight_plot, parameters		
Nevzerov TWC para 605		
2DC IWC para 1302		
2DP IWC para 1312		

CLOUD PHYSICS PROCESSING LOG

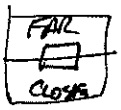
Flight number: **B250**
Date of Flight: 30/11/06

C) PCASP PROCESSING		
Processing Stage	Done?	Comments
1) Complete stage 7) in 2D processing	Y	
Ensures B250_FSP.DAT containing raw PCASP data is	Y	
written to directory PMSDATA:	Y	
2) FLOODS> **RUN MRFB:[PMS.PCASP]PROCPCASP_NEW**	Y	
a) Flight number: **Bnnn**	Y	
b) File name: **PMSDATA:Bnnn_FSP.DAT**	Y	
c) Root output name: **PMSDATA:Bnnn_PROCPCASP**	Y	
Produces PMSDATA:Bnnn_PROCPCASP.DAT (binary)	Y	
PMSDATA:Bnnn_PROCPCASP.OUT (ascii)	Y	
d) Minimum size channel: *default = 1*	**Y**	**Min size =1**
If smallest size channel are known to be noisy the value	Y	
of the highest noise free channel to be entered here	Y	
e) Calibration volume flow rate:		
Use the most recent value. 1.8ccs^{-1}	**Y**	**Vol flow rate =** 1.80
*Calibration files to be stored in **Exeter***	Y	
Entering zero gives default value = 1.0 cm^{3}s^{-1}	Y	
f) Time correction: *Same value as used in 2D processing stage 9d*	Y	
g) Start time: *0 if unknown*	Y	
h) End time: *240000 if unknown*	Y	
3) FLOODS> **WAVE**	Y	Use PVWAVE for this section
i).WAVE> **write_procpcasp_to_m5, 'pmsdata:Bnnn_procpcasp.dat', 'pmsdata:Bnnn_m5procpcasp'**	Y	
ii). WAVE> **exit**	Y	
4) FLOODS> **MODIFY**		
a) Modifying datasets: **pmsdata:Bnnn_m5procpcasp**		
b) Dataset: **mfddata:Bnnn_mfdX**		**X =a**
c) New dataset: **mfddata:Bnnn_mfdY**		**Y = X+1 =b**
d) Parameter description file: *leave blank to use default*		
5) CHECKS		
Are PCASP and JW peaks synchronous?		**Merged OK?**
In flight_plot, parameters		yes
Neph – total blue scatter. 762		
PCASP conc para 1550		

Flight Manager's Instrument Status Log

Flight No. **B** 250 Date: 30 September 2006

Instrument	Fitted	Operated	Instrument	Fitted	Operated
Navigation			**Cloud Physics**		
INU		**Y**	**Probes**		
XR5M GPS		**Y**	FFSSP		**Y**
Cruciform GPS		**N**	PCASP		**Y**
Satcom C		**Y**	2D-P		**Y**
Satcom H		**Y**	2D-C		Y
Thermometers			Cloudscope		
De-Iced Temp		**Y**	SID 1	**N**	
Non De-Iced		**Y**	SID 2	**N**	
Heimann		**Y**	HVPS	**N**	
Hygrometers			CIP25	**N**	
G. Eastern		**Y**	CIP100	**Y**	
J. Williams		**Y**			
Nevzorov		**Y**			
TWC		**Y**			
FWVS	**N**		**Racks:**		
Radiometers			INC	**N**	
Upper Clear		**Y**	CCN / CNC	**N**	
" Red		**Y**	CVI	**N**	
" Pyrgeometer		**Y**			
" JNO2	**N**		**Aerosol**		
Lower Clear		**Y**	PSAP	**Y**	**N**
" Red		**Y**	Nephelometer	**Y**	**Y**
" Pyrgeometer	**N**		Filters	**Y**	**N**
" JNO2	**N**		AMS	**N**	
Large Radiometers					
TAFTS	**N**		**Others:**		
MARSS	**N**		CDP	**Y**	**N**
DEIMOS	**N**		SAW	Y	N
ARIES	**N**		NIR TDLAS	Y	N
SWS	N		2BT O3		N
Chemistry			VACC		N
Ozone		Y	PEROXIDE	Y	N
SO2		N	Formaldehyde	Y	N
NOX		Y	ADA	N	N
CO		Y	CPI	N	N
ORAC	N	N	NOxy	N	
PAN	Y	N	PTRMS	N	
PERCA		N	Bag Sampling	N	
WAS		N	Tube Sampling	N	



IR CAMERA FLIGHT LOG

Flight No.	250
Date	30/11/06
Fitted Lens	100mm
Active NUC	05/01/2006
BPM Filename	DBTEST1

Campaign	NEON
Operator	SB
Camera Angle	35 Degs down

Source Ref. Temp.	Hot	15 Degs C
	Cold	45 Degs C

DATA RECORDING Start Time	Stop Time	Run Number	Height	Remarks
	11:05:03	P1 END		MISSED APROACH DOWN RUNWAY
	11:12:51		500ft	500 ft ALONG RUNWAY
	11 19 36		500ft	ALONG GRASS
	11:25 57	~~P1~~ @	1000ft	OK -
	11:30:51	~~P2~~ @	1000ft	
	11.37.16		3000ft	
	11:44:13		3000ft	DONE @ 10° ATTACK - OK
	11:50:02		5000ft	- MISS
	11:58.35		500ft	- HIT BUT TOWARD 2ND END OF RUNWAY (Forgot to stop)
	12:02:27		5000ft	HIT
	12:11:14		5000ft	- GOOD START BUT LOST STRAIGH + LEVEL
	12:18 13		10,000	- SOT FIRST END - NOT CENTRAL
	12:27:06		10,000	- FIRST HALF OF RUNWAY - BUT OK
	12:33:28		10,000	- FIRST TOP OF RUNWAY - NOT SO GOOD
	13:05:13			- MISSED APROACH
	13:12 32		500	- DOWN RUNWAY
	13:17:54		500	DOWN GRASS - RUNWAY JUST OFF
	13:24:18		1000	- GOOD.
			SHIPS	- SEA STATE SLIGHTLY CHOPPY - SOME WHITE TOPS.
	13:33:01		5000	REAR HALF OF SHIP.
	13:40:58		3000	MISS
	13:45:48		3000	MISS - ON DOWN LOOKING CAMERA
	13:50:59		3000	TWO SHIPS MISS FIRST (LARGE) HIT SECOND. (SMALL)
	13:55:13		3000	MISS
	13:57:50		1000	MISS
	14:01:28		1000	MISS
	14.05:29		1000	MISS
	14:20:54		1000	MISS
	14:26:25		1000	MISS
	14:32 04		1000	MISS
	14:40 38		3000	MISS - STEAM ON TOP OF SPOTTER
	14:45:51		3000	MISS
	14:51:36		3000	MISS - ON SPOTTER - TOO FAR BY LEESTH
	14:57:22		3000	BOW SHOT. (LONG LEAD IN...)

B250

CAL Nº2

30/11/06

TARGET TEMP	INITIAL CABIN TIME 13.47.06	
15.4	① min	↑ 20°C
16.7	②	
17.9	3	
18.8	4	
19.5	5	
20.2	6	LEFT @ 20°C
20.7	7	
21.2	8	↑ 40°C
22.6	9	
25.3	10	
27.4	11	
29.4	12	
31.2	13	
33.0	14	
34.4	15	
35.4	16	
36.6	17	
37.7	18	
38.7	19	
39.5	20	
40.1	21.	LEFT @ 40°C
40.6	22	
40.9	23	16 11 06. ?

IIR CAMERA CALIBRATION LOG

Flight No: 250 Operator: JVS

30/11/06

File Name	Target Temperature ^{0}C	Time	
		08 55	
	11.0	~~57 06~~	← TIME WHEN CABIN
	11.0	58 06	1 min ↑
	13.4		2 min 20°C
	15.2		3 min
	16.8		4
	17.9		5
	18.9		6
	19.7		7
	20.5		8
	21.1		9
	21.5		10 ↑ 40°C
	23.4		11
	25.7		12
	27.5		13
	29.3		14
	30.8		15
	31.9		16
	33.4		17
	34.5		18
	35.3		19
	36.3		20
	37.1		21
	37.5		22
	38.1		23
	38.8		24
	39.1		25
	39.4		26
	39.6		27
	39.8	09 25 06	28

Faults / Incidents Log

Flight No. B250
Date: 30 November 2006

Instruments

1. Cruciform GPS U/S
2. 2DC shut down – generating huge noise files
3. TWC flashed as expected on switch-on, multiple errors in data system u/s
4. Mission Scientist PC faulty – no comms with HORACE
5. Core Chem network comms u/s

Aircraft

1.

Satcom H Calls - Nil

Pre-Flighter's Log

Date: 30/4/06 Flight No: B250 Pre-Flighter: JT

Item	√ or x	Location	Action	Comments
1	X	Hangar	Collect Dustbin, put on a/c	STILL NO BIN
		Aircraft Cabin		
2	✓	Core Chemistry	Gases x 3 ON	
3	✓	Cabin	All Racks Checked	
4	✓	Fwd CorCon	All reqd CBs made	
5	✓	Aft CorCon	CBs made, PCs ON	
6	✓	HORACE	Optical Disk loaded	
7	✓	HORACE	Recording data	
8	✓	HORACE	DLU Status Checked	
9	✓	HORACE	HORACE Status Checked	
10	✓	Satcom H	Power LED ON	
11	✓	Nevzorov	Checked and OFF	
12	✓	GPS	Checked	
13	✓	INU	Align	
14	✓	Cameras Pictures	Checked x 4 OK	
15	✓	Core Chemistry	Instruments Checked OK	PRESSURE COL A LITTLE HIGH @ 5.17 Bar
16	✓	Core Chemistry	CO Flows Checked OK	
17	X	FWVS	Set up	NOT FITTED.
18	✓	Video x 2	Records okay, Rewind	
19	✓	Delced Rosemount	Heater Checked / Set	
20	✓	Heimann	Calibration Checked	
21	✓	TWC	ON & Checked	TSRC PARA 74 NOT INCREASING
22	✓	GE	Balance checked	
23	✓	INU	Navigate then back to Align	
24	✓	Hubs x 4	Checked ON	
25	✓	Fwd Console	Miss. Sci Laptop CB made	& CB on Port Fwd SSP
26		CNC	Butanol filled	
27	X	CGPS	Set up	NOT WORKING SC
28	✓	Miss. Sci Laptop	Checked Onboard	
	✓	NEPH @	ON & ZEROED	

External Checks overleaf →

Pre-Flighter's Log

Item	√ or x	Location	Action	Comments
		External		
29	✓	Turb Probe	Clean if reqd, Photo taken	
30	✓	JW	Cleaned & Checked	
31	✓	DI Rosemount	Cleaned & Checked	
32	✓	NDI Rosemount	Cleaned & Checked	
33	✓	Nevzorov	Cleaned/windings checked	
34	✓	GE	Cleaned & Checked	
35	✓	Lower BBRs	Domes cleaned/checked	
36	✓	Camera Windows	Cleaned	
37	✓	Heimann	Lens checked OK	LOOKS LIKE A COUPLE OF SPOTS.
38	✓	TWC Cover	Fitted if required	
39	✓	All other covers	Removed	
40		Dustbin	Returned to hangar	
41		Tools	Check ALL in Toolkit	
42		Tools	Avalon informed	
		Avalon Checks		Signed
43	✓	Upper BBRs Checked & Cleaned		
44	N/A	ICEX applied		
45	N/A	Traps empty (weekly only)		

MISSING LOG SHEETS:

The following log sheets are not available for flight B250:

Log	Reason
Core Chemistry	No In Flight log (except in cases of instrument problems)
IR Camera In Flight log	IR Camera Processing log not currently available
IR Camera Processing log	IR Camera Processing log not currently available

Document control

Revision	Date	Author	Comments
r0	17 Dec 2006	Doug Anderson	Initial version missing the above noted logs
r1			
r2			

VIDEO RECORDINGS:

3 x spotter camera
3 x IR camera
1 x FFC/spotter
1 x Down/IR Cameras

Digital8 video recordings from this flight reside with :

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